**GENERAL**

**EDUCATION and OUTREACH**

**ON-GOING FLIGHT PROGRAM**

**FUTURE FLIGHT PROGRAM - ISSA PHASE I/II/III**

EXACT Investigators Present Results at LT-22

Two posters on the flightFire and ice – a good place definition experiment Experiments Along Coeto search for life?Jörn Helbxistence near Tricriticality (EXACT) were presented at the 22nd International Low Temperature Conference (LT-22) held in Helsinki in early August. Professor Norbert Mulders of the University of Delaware, one of ertInstitute of Planetary Rethe co-investigators on EXACT, presented his work on deriving the equations for the propagation of heat pulses in mixtures of helium-3 and helium-4. His poster was entitled "A Nonlinear Wave Equation fosearchDLRRutherfordstrasse 2r Second-Sound Propagation in 3He-4He Mixtures". Also at LT-22, EXACT's work on developing a nano-Kelvin resol, 12489 BerlinGERMANYjoern.hution thermometer for the temperatures below 1K elbert@dlr.de Creating a habwas presented by Dr. John Panek of JPL. His poster was entitled "A High-Resolution Thermometer for the Temperature Range 0.75-1.0 K".

**ISSUES AND CONCERNS**

**SCIENCE HIGHLIGHTS**

:

Quantum tunneling across spin domains in a Bose-Einstein condensate.

**MIT Group Explores Boundary between Domains in a Condensate**

Wolfgang Ketterle of MIT reports that a paper titled "Quantum tunneling across spin domains in itable environment is a compa Bose-Einstein condensate" was recently plex process involving a wideublished i variety of interacting procn Physical Review Letters (Phys. Rev. Lett. **83**, 661-665 (1999)). The authors D.M. Stamper-Kurn, H.-J. Miesner, A.P. Chikkatur, S. Inouye, J. Stenger, and W. Ketterle describe esses. A prerequisite for andynamics in y biological activity is an a condensate cenergy source. The terrestrionsisting of two immiscible components. In case of two immial example of the black smokscible fluids, gravity tries to localize the heavier fluid below the lighter one. When the heavier one is placed on top of the lighter one, a metastable situation arises. The analers shows how efficient geotogous situation was prepared by the MIT group in a spinor Bose-Einstein condhermal processes are as an eensate, with a magnetic field gradient playing the role of gravity. For a sufficiently strong gradient, tunneling of one component througnergy source.There is ample h the other was observed and led to a stable equilibrium state. The observation of the tunneling rates provides a sensitive probe of the boundary existing between the two immiscible spin domains.

**UPCOMING EVENTS**